Abstract Submitted
for the DFD12 Meeting of
The American Physical Society

Langrangian Coherent Structure Visualizations in High-Resolution DNS DANIEL NELSON, San Diego State University — Lagrangian coherent structures have become an important addition to flow visualization and analysis of turbulent flow topology and separated flow. The identification of zero-mass flux material surfaces is shedding new light on flow transport phenomena. We discuss a high-order resolution determination of the Lagrangian coherent structures. In direct numerical simulation based on higher-order discontinuous Galerkin method, finite time Lyapunov exponents are determined on-the-fly in forward and backward-time based on spectral operators. A higher-order time integrator traces fluid particles that are initialized at quadrature points. Lagrangian coherent structures are visualized in a range of flows including a shear layer, convected vortex and bluff body wakes.

Daniel Nelson
San Diego State University

Date submitted: 02 Aug 2012 Electronic form version 1.4